AMENDMENTS TO THE SPECIFICATION

Please amend paragraph [0011] as follows.

[0011]

Preferably, the second approximation curve is a curve which approximates the displacement data in the fourth region in addition to the ~~fourth~~ third region, using a plurality of data points in the displacement data in the fourth region as nodes. Preferably, the second approximation curve is calculated using a least squares method by applying weighting coefficients to the displacement data in the third region and to the displacement data in the fourth region, and a greater weighting coefficient is applied to the displacement data in the fourth region than a weighting coefficient applied to the displacement data in the third region to approximate the displacement data in the third and fourth regions.

Please amend paragraph [0021] as follows.

[0021]

The acceleration sensor 2 , which is an acceleration <u>sensor</u> in three directions that are orthogonal to each other, is exemplified by a semiconductor acceleration sensor, for example, disclosed in Japanese Patent Application No. 2003-134727 (JP 2004-340616 A) filed by the present applicant. The semiconductor acceleration sensor includes, specifically, an Si wafer having a diaphragm formed inside the outer peripheral frame portion of the Si wafer, and a pedestal for fixing the outer peripheral frame portion of the Si wafer. A weight is provided at the center part of one surface of the diaphragm, and a plurality of piezoresistors are formed on the diaphragm. When acceleration is applied to this semiconductor acceleration sensor, the diaphragm is deformed to cause the resistance values of the piezoresistors to change. In order to detect such changes as acceleration information, a bridge circuit is formed.

By fixing the acceleration sensor to the tire inner circumference surface, the acceleration applied to the tread portion during tire rotation can be measured.

Although the acceleration sensor 2 is of an acceleration sensor for detecting acceleration in three directions that are orthogonal to each other, other sensors may be used as the acceleration sensor 2, including acceleration pickups that use piezoelectric elements for detecting acceleration

in three directions that are orthogonal to each other, and distortion gage type acceleration pickups that incorporate distortion gages for detecting acceleration in three directions that are orthogonal to each other. In the practice of the present invention, acceleration in the tire width direction and acceleration in the tire radial direction are measured. Acceleration sensors capable of measuring acceleration in the tire circumferential direction, in addition to the acceleration in those two directions may be used.

Please amend paragraph [0027] as follows.

[0027]

The slip region specifying unit 20 is a unit for specifying, from the data of tire deformation obtained in the deformation calculating unit 16, a ~~contact~~ slip region, and within the range of the determined contact region, specifying a slip region by using the pulse train generated in the second signal processing unit 18.

Description will be given later on specific processing in the first signal processing unit 14, the deformation calculating unit 16, the second signal processing unit 18, and the slip region identifying unit 20.

Please amend paragraph [0033] as follows.

[0033]

More specifically, the background component 1 is obtained in the following manner. The region of the tire circumference is divided into a first region including a contact region in contact with a road surface and a second region including other than the first region. The regions that are defined as the first region include a region having a θ of greater than 90 degree and less than 270 degree, a region having a θ of greater than 450 degree and less than 630 degree, and a region having a θ of greater than 810 degree and less than ~~980~~ 990 degree. On the other hand, the regions that are defined as the second region include a region having a θ of equal to or greater than 0 degree and equal to or less than 90 degree and equal to or greater than 270 degree and equal to or less than 360 degree; a region having a θ of equal to or greater than 360 degree and equal to or less than 450 degree and equal to or greater than 630 degree and equal to or less than 720 degree; and a region having a θ of equal to or greater than 720 degree and equal to or less

than 810 degree and equal to or greater than 990 degree and equal to or less than 1080 degree. The background component 1 is obtained by calculating a first approximation curve to the data in the first and the second regions by means of least squires method using a plurality of positions (θ, or time corresponding to θ) on the circumference in the second region as the nodes and using a predetermined function groups for example spline functions of third order. The nodes provide constraint conditions on the horizontal axis, that set local curvatures (jog) of the spline functions. In the example shown in Fig. 3B, the positions as indicated by "Δ" in Fig. 3B, that is, the positions of time where θ is 10 degree, 30 degree, 50 degree, 70 degree, 90 degree, 270 degree, 290 degree, 310 degree, 330 degree, 350 degree, 370 degree, 390 degree, 410 degree, 430 degree, 450 degree, 630 degree, 650 degree, 670 degree, 690 degree, 710 degree, 730 degree, 750 degree, 770 degree, 790 degree, 810 degree, 990 degree, 1010 degree, 1030 degree, 1050 degree, and 1070 degree are defined as the node positions.

Please amend paragraph [0037] as follows.

[0037]

Noise components contained in the displacement data are calculated as the background component 2 in a similar manner as used for calculating the background component 1 in step S104 (step S110).

More specifically, a region of the tire circumference is divided into a third region including a contact region in contact with a road surface and a fourth region including other than the third region. The regions which are defined as the third region include a region having a θ of greater than 90 degree and less than 270 degree, a region having a θ of greater than 450 degree and less than 630 degree, and a region having a θ of greater than 810 degree and less than ~~980~~ 990 degree. The regions that are defined as the fourth region include a region having a θ of equal to or greater than 0 degree and equal to or less than 90 degree, and equal to or greater than 270 degree and equal to or less than 360 degree; a region having a θ of equal to or greater than 360 degree and equal to or less than 450 degree, and equal to or greater than 630 degree and equal to or less than 720 degree; and a region having a θ of equal to or greater than 720 degree and equal to or less than 810 degree, and equal to or greater than 990 degree and equal to or less than 1080 degree. The background component 2 is obtained by using a plurality of positions (θ, or time

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corresponding to θ) on the circumference in the fourth region as nodes so as to calculate a second approximation curve to the data in the third and fourth regions through least squares method using a set of predetermined functions. The third region may be the same with or different from the above-described first region. Also, the fourth region may be the same with or different from the above-described second region. As described above, the nodes provide constraint conditions on the horizontal axis, that set local curvatures (jog) of the spline functions. Fig. 4B shows the second approximation curve representing the background component 2 with a dotted line. In the example shown in Fig. 4B, the positions as indicated by "Δ" in Fig. 4B, that is, the positions of time where θ is 10 degree, 30 degree, 50 degree, 70 degree, 90 degree, 270 degree, 290 degree, 310 degree, 330 degree, 350 degree, 370 degree, 390 degree, 410 degree, 430 degree, 450 degree, 630 degree, 650 degree, 670 degree, 690 degree, 710 degree, 730 degree, 750 degree, 770 degree, 790 degree, 810 degree, 990 degree, 1010 degree, 1030 degree, 1050 degree, and 1070 degree are defined as the node positions.

Please amend paragraph [0038] as follows.

[0038]

By carrying out function approximation on the data shown in Fig. 4A with the third-order spline functions having the above described nodes, a second approximation curve as indicated by dotted lines in Fig. 4B is calculated. When carrying out function approximation, there are no nodes in the third regions, and only the plurality of nodes in the fourth regions are used. In least squares method that is carried out in conjunction with the function approximation, the weighting coefficient for the fourth region is set to 1, and the weighting coefficient for the third regions is set to 0.01. The reason why the weighting coefficient for the third regions is smaller than the weighting coefficient for the fourth regions, and no nodes are set in the third regions in calculating the background component 2, is to calculate the background component 2 by using the displacement data mainly in the fourth regions. In the fourth regions, because deformation of the tread portion due to contact is small and such deformation changes smoothly on the circumference, the tire deformation is small on the circumference and such changes are also extremely small. In contrast, in the third regions, the tire tread portion is greatly displaced based on deformation due to contact and changes rapidly. For this reason, the deformation due to

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contact is great on the circumference and changes rapidly. In other words, the deformation of the tread portion in the fourth region is substantially constant as compared to the ~~third~~ deformation in the third region. Accordingly, by calculating the second approximation curve mainly using the displacement data obtained in the fourth regions through integration of second order, the deformation of the rotating tire can be obtained accurately, not only in the fourth regions, but also in the third regions including the contact region.

Fig. 4B shows the second approximation curve calculated mainly using the displacement data in the fourth regions with dotted lines. In the fourth regions, the second approximation curve substantially coincides with the displacement data (solid lines).